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The Impact of Extension Water Resource Programming in Idaho over Thirty-Five Years

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Abstract

This thirty-five-year survey study documents the positive impact that Idaho Extension had on public water resources in Idaho. Statistically designed surveys were conducted in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023 to document trends of public awareness, knowledge, and voluntary actions to improve water resources. Since 1988, over 82% of Idahoans have considered their drinking water safe. Extension programming emphasized the use of best management practices (BMPs) to improve water resources. The percentage of Idahoans that took voluntary actions to improve water quality increased from 26% in 1988 to 80% in 2023. Likewise, the percentage of Idahoans that took voluntary actions to conserve water resources increased from 16% in 1988 to over 73% in 2023.

Over time, the percentage of Idahoans who worried about the impact of population growth on water resources increased from 24% to 86% between 1988 and 2023. The water resources survey study showed that over 63% of Idahoans still considered irrigated agriculture to be an important cultural aspect of life in Idaho in 2023. However, this percentage has significantly fallen from the 93% figure recorded in the 1988 survey. Approximately 24%, 28%, 34%, 34%, 46%, 50%, 52%, and 59% of the surveyed public felt that state government failed to address important water resource issues based on the 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023 survey results, respectively. Extension water programming reached over 118,000 residents per year and improved public knowledge about drinking water, surface, and groundwater quality and the importance of water to Idahoans.

Keywords: voluntary actions, drinking water quality, surface water, groundwater, irrigated agriculture, population growth

Introduction

Although water covers nearly 71% of the Earth's surface, fresh water is finite, unequally distributed, and scarce in many of the most heavily populated regions of the world. Over 96% of the Earth's water is saltwater in the oceans, while only 3.5% of Earth's waters are freshwater. Studies suggest that each human requires 900,000 L of water per year to meet their needs (Arnell et al. 2011; Postel et al. 1996). This includes water used in drinking, food production, food preparation, hygiene, and sanitation. Currently, there is adequate fresh water to meet human needs on a global basis; however, on a country-by-country basis this was not possible in 2025. This problem will exacerbate as the human world population increases from 8,200,000,000 to 9,800,000,000 by 2050. Based on current human freshwater per capita needs, by 2050 fifty-two countries will not be able to supply adequate fresh water to their citizens (Gleick 1998; Chenoweth 2008).

Much of the fresh water falls as mountain snow in the Idaho, Wyoming, and British Columbia portions of the Rocky Mountains in the colder parts of a year. This water is stored as snowpack in the winter and when temperatures warm up in late March–June, it melts and flows down streams and rivers, where it can be captured to support economic activity in Idaho and the downriver states of Washington and Oregon. This snowpack, through rivers and indirectly through groundwater recharge, provides irrigation water for over 1,700,000 ha of agricultural land in Idaho. In addition, the surface waters flow through numerous dams that meet over 60% of Idaho's electricity needs. The rivers support the transport of economic goods and provide numerous recreational activities for Idaho residents and for tourists from five continents. Indirectly and directly, the mountain snows provide drinking water, wetland habitat, and a favorable aquatic habitat for wildlife and humans. The water from the snowpack provides both good water quality and sufficient water quantity to meet the current needs of Idaho citizens.

Surveys show that Idaho citizens consider water and soils to be the most important natural resources in the state. Water became a more important natural resource and issue in the 1980s when President George H. W. Bush created a National Water Quality initiative (Mahler and Barber 2015). Because of this initiative, many federal agencies directed new and existing resources to enhance water quality. Consequently, since 1990 water quality has been a priority topic for the United States Department of Agriculture (USDA) and federal, state, and local Extension. The additional resources helped to support state and local Extension programming in the fifty states and seven territories associated with the United States. Because of this initiative, smaller states with limited resources were able to hire Extension faculty to support programming in water-quality and associated water resource issues. The support that was established in the early 1990s has been around for and has supported Extension programming for more than thirty-five years.

The University of Idaho Extension water resources program began in 1988 with programming responsibilities spread across three existing faculty. By 2020, the program grew to twenty-three Extension faculty devoting at least 15% of their programming time to water resources.

Historically, the evaluation of Extension programs has been difficult and few agree on the best methods for short-, medium-, and long-term evaluation of programs (Shepard 2002). Consequently, an evaluation strategy was developed as this program began. The evaluation effort is based on a survey program of the public that would be conducted every five or six years. The survey program was developed to determine public preferences and knowledge about water issues and to determine the types of actions voluntarily taken by the public to improve water-quality and water-quantity (conservation) issues in Idaho. The survey initially designed in 1988 was designed to be repeated in 1993, 1997, 2002, 2007, 2012, 2017, and 2023 using the same questions. The answers from the surveys were plotted by survey year and the trends allow faculty to determine if the Extension programs were successful. The initial survey consisted of ten questions and asked information about drinking water quality, surface water, groundwater, voluntary actions to enhance water quality, voluntary actions to address water quantity (conservation), and the impact of population growth on water resources, irrigated agriculture, and the role of state government in water resources. The basic objective of this survey study is to determine the impact of Extension education programs on water resource issues in Idaho.

Materials and Methods

The data to determine the impact of Extension on water resources in Idaho was collected using a survey instrument first developed in 1988. This survey, consisting of ten questions, was designed to understand public attitudes and actions taken toward water resources in Idaho. The original survey was used throughout the thirty-five-year survey study and includes the following ten survey questions:

Q-1. Do you consider the drinking water that you obtain from your kitchen tap safe to drink? Possible answers (choose only one): a. Yes; b. No; c. I don't know.

Q-2. Please rate the quality of surface waters in the area where you live. Possible answers (choose only one): a. excellent; b. good; c. fair; d. poor; e. I don't know.

Q-3. Please rate the quality of groundwater in the area where you live. Possible answers (choose only one): a. excellent; b. good; c. fair; d. poor; e. I don't know.

Q-4. Have you taken any voluntary actions to protect water quality where you live in the last three years? Possible answers (choose only one): a. Yes; b. No; c. I don't know.

Q-5. Have you taken any voluntary actions to protect water quantity (water conservation) where you live in the last three years? Possible answers (choose only one): a. Yes; b. No; c. I don't know.

Q-6. Are you concerned that population growth in Idaho is negatively impacting water resources? Possible answers (choose only one): a. No, I am not concerned; b. Yes, I am concerned that population growth is having a negative impact on water resources; c. I don't know.

Q-7. Is irrigated agriculture (irrigated farmland) an important cultural aspect of life in Idaho? Possible answers (choose only one): a. Yes; b. No; c. I don't know.

Q-8. Is state government adequately addressing important water resource issues in Idaho? Possible answers (choose only one): a. Yes; b. No; c. I don't know.

Q-9. Do you have any knowledge about the cooperative Extension system in Idaho? Possible answers (choose only one): a. Yes; b. No; c. I don't know.

Q-10. Have you ever received any information from the cooperative Extension system in Idaho? Possible answers (choose only one): a. Yes; b. No; c. I don't know.

The survey was sent to 1,240 randomly chosen Idaho residents in 1988. An identical version was then sent to another 1,240 randomly chosen Idaho residents in 1993, 1997, 2002, 2007, 2012, 2017, and 2023.

Mailing addresses were obtained from a social science survey company (SSI, Norwich, Connecticut). The distribution of surveys was based on two factors. First, ten surveys were sent to residents of each of the forty-four counties in Idaho (440 surveys). Second, the remaining eight hundred surveys were sent to residents of Idaho counties based on their percentage of state residents at the time that the 1980 federal census was conducted. This resulted in another six hundred surveys sent to the ten most populous counties in Idaho, while the remaining thirty-four counties received an additional collective total of two hundred surveys. The ten highly populated counties of Ada (172 surveys), Canyon (89), Bonneville (67), Bannock (65), Kootenai (60), Twin Falls (53), Nez Perce (33), and Latah (29) received the highest survey allocations in addition to the initial ten surveys.

A target of 620 completed questionnaires was chosen as the goal in each of the eight survey years (1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023), resulting in a sampling error of 5%–6% (Salent and Dillman 1994). The survey process was designed to receive a completed return rate of 50%. Four mailings were planned to achieve that return rate (Dillman 2000). The mailing strategy used was developed by Dillman and was similar in design to the other twenty-four surveys conducted in Idaho between 1988 and 2024 (Mahler et al. 2010; SAS Institute 2004; Babbie 1983). The mailings for each survey year were as follows: The first mailing included a copy of the water resources survey form, a business reply envelope, and a cover letter that (1) identified the survey's authors, (2) explained the purpose of the survey, (3) assured respondents of anonymity, and (4) asked potential respondents to fill out the survey and return it in the supplied business reply envelope. The second mailing occurred five weeks later and consisted of a postcard that stressed the importance of the survey and a reminder to fill out and return the completed survey. Five weeks later, the third mailing was sent to residents who did not respond to the first or second mailing. This mailing included a reminder letter, another copy of the survey, and a business reply envelope. Five weeks later, the fourth mailing consisted of a reminder postcard that was sent to every resident that had not returned a completed survey yet. The survey data was statistically analyzed, using Statistical Analysis System (SAS) software and paired t-tests (SAS Institute 2004; Steel and Torrie 1960).

Historical data about the history of water resource Extension programming was obtained from annual University of Idaho Smith-Lever reports and historical employment data as well as from professional journal publications, Extension publications, and other progress reports submitted to the USDA.

Results and Discussion

Prior to 1988, there was little emphasis on water quality by Extension at the University of Idaho, even though water-quality education was embedded in several outreach programs, including integrated pest management, soil fertility management, irrigation management, and pesticide safety. At this time, Extension in Idaho did not have a faculty member assigned for Extension water-quality leadership. However, this changed in 1988 with the launch of President George H. Bush's National Water Quality Initiative. The initiative launched a series of USDA competitive programs that required a three-way partnership between the Natural Resources Conservation Service (NRCS), the Agricultural Stabilization and Conservation Service (ASCS), and Extension (USDA-ES). Initially, competitive funding was provided for eight major water-quality demonstration projects designed to improve and protect water quality on a large basin scale over a five-year period and for forty-five smaller hydrologic unit projects that would also last for a five-year period. All states were invited to submit project proposals; however, the state offices of NRCS, ASCS, and USDA-ES had to work together and have a truly integrated project for proposal consideration. In the first year of the call for proposals, Idaho received funding for both a hydrologic unit and larger regional demonstration water project. Project funds allowed UI Extension system to fund full-time Extension educators for each project. This was the beginning of the University of Idaho's commitment to Extension water resource programming.

In addition to the federally sponsored projects, USDA-ES initially provided some formula funds to each state to address water-quality Extension. For each land grant and 1890 institution to receive these funds, a designated faculty member at each school had to provide Extension leadership for water-quality programming. This became the third faculty member at the University of Idaho dedicated to water resource education. From this initial group of three Extension educators, the number of faculty significantly involved in water-quality, water-quantity (conservation), and water resource education grew to over ten individuals by 2008. Each of these individuals reported an annual time commitment of at least 15% to water resource programming.

Regional Project

In the late 1990s, USDA-ES made competitive money available for state Extension programs to focus on one or more of the following eight water resource programming areas: (1) animal waste management, (2) water conservation and agricultural water management, (3) watershed management/education, (4) nutrient and pesticide management, (5) pollution prevention/ environmental restoration, (6) water policy and economics, (7) drinking water and human health, and (8) human dimension aspects of measuring acceptance and change. The USDA realized that many state water-quality Extension programs were small and could not cover all of the above programming areas. As a result, they encouraged states to work on a regional basis so that the eight focus areas could be covered. The competitive program funded ten regional projects. Idaho became a part of the Pacific Northwest Regional Project, which included the states of Alaska, Idaho, Oregon, and Washington. The ten national Extension water regions corresponded to the ten regions of the Environmental Protection Agency (EPA). The convergence was designed to make the Extension system and EPA integral partners in water-quality education and outreach.

The Pacific Northwest regional water-quality team consisted of the following eight positions: (1) water-quality coordinator from the University of Idaho, (2) water-quality coordinator from the University of Alaska, (3) water-quality coordinator from Oregon State University, (4) water-quality coordinator from Washington State University, (5) water-quality coordinator from Northwest Indian College, (6) agriculture sector team leader from EPA Region X, (7) water institute director from Washington State University, (8) USDA-NRCS representative from Portland, Oregon, and (8) Extension liaison located at EPA Region X headquarters. The coordination team met three times a year at the EPA Region X headquarters in Seattle, Washington, because all team members could easily drive or fly into this city. During the meetings, members evaluated current programming and planned future programming events across the four-state region. The coordination group was active from 1994 through 2015. The University of Idaho water-quality coordinator served as chair of this group during its entire existence.

The Pacific Northwest region was successful in competing for water resource funds on both a regional and national basis for specific Extension projects. The region successfully acquired over $10,000,000 in competitive funds for water resource programming. From a national basis, the regional water-quality programs were particularly successful in smaller states, where staffing levels prevented coverage of all eight water resource theme areas. For instance, Oregon State University had a large and vibrant animal waste management program, while few resources existed in Idaho and Alaska to meet waste programming needs. So, Oregon State University provided these needed services in Idaho and Alaska. Conversely, the University of Idaho provided support in water management and public policy to Oregon's Extension programs.

The regional approach allowed the four Pacific Northwest states to magnify the number of Extension staff capable of performing water outreach programs without having to significantly increase permanent staffing in each of the four states. Consequently, Idaho was able to triple the number of workshops and Extension publications on water resources available to Idahoans.

Surveys

A significant portion of UI Extension's water resource programming was devoted to developing and conducting a statistically valid public survey program about public perceptions and actions toward water resources in Idaho. The surveys allowed Extension to determine the effectiveness of Idaho Extension programs by tracking public knowledge and perceptions of water issues and the capability to measure voluntary actions taken by the public to positively impact the state's waters. Major surveys were designed and conducted in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023. Survey results over this thirty-five-year period were plotted to evaluate trends and understand Extension's impact on water resources in Idaho.

The survey methodology used in this thirty-five-year survey study was not designed to be unique, but rather to be used as a tool to track opinions and actions about water resources. Based on the analysis of each survey year's data set, appropriate educational programs were instituted or modified to meet public needs in Idaho. The 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023 surveys received completed return rates of 52.6%, 55.2%, 52.3%, 51.9%, 54.6%, 53.2%, 50.9%, and 53.4%, respectively. Consequently, the target return rate of 50% was achieved for each survey.

The Dillman methodology was in large part responsible for the high survey return rate. However, the high level of interest in water by Idaho citizens also contributed to the high survey return rate. Although not emphasized in this publication, demographic information on the citizens that completed these surveys was collected and evaluated. Fifty-five percent of survey respondents were male. Forty-six percent of survey takers reported living in urban communities and 84% of survey respondents were high school graduates. Older residents were more likely to complete the survey than residents younger than forty years old.

Drinking Water

The public perception of the safety of drinking water in Idaho was measured from 1988 to 2023 (Figure 1). Extension programming about drinking-water quality was popular and well-attended over this thirty-five-year period primarily because everyone drinks water. Over 90% of surveyed Idaho residents considered their drinking water safe in 1988, 1993, 1997, 2002, and 2007. A large majority of the public still considered their drinking water safe, but to a lesser extent in 2012, 2017, and 2023. This small, but significant drop in the percentage of the public considering their drinking water safe was probably due to increased media scrutiny about drinking-water safety on a national scale and an increase in the marketing and availability of secondary in-home filters by the private sector (Table 1). Both factors made many citizens worry about the safety of their supplied drinking water. Overall, it is remarkable that a minimum of 82% of Idahoans considered their drinking water safe in every survey year.

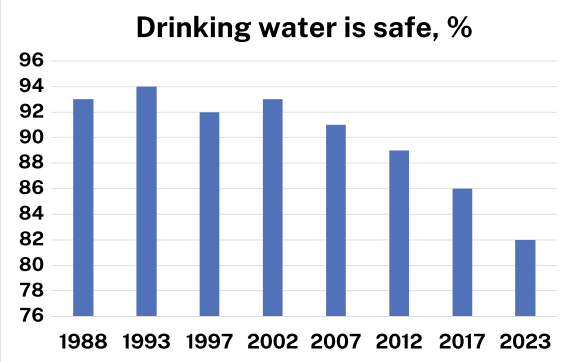


Figure 1. Percentage of Idahoans that consider drinking water from their in-home tap to be safe based on University of Idaho surveys conducted in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023.

Table 1. Statistical significance of year range on public opinion about survey items by University of Idaho surveys in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023.

Survey item	1988 versus 2023	1988 versus 2012	2012 versus 2023
	p value		
Drinking water	NS	NS	0.04
Surface water	0.006	0.02	NS
Groundwater	0.014	0.026	NS
Voluntary actions – quality	0.0005	0.017	0.03
Voluntary actions – quantity	0.0038	0.002	0.046
Population growth	0.0046	0.004	0.025
Irrigated agriculture	0.035	0.048	0.027
State government action	0.024	0.008	0.016

The thirty-five-year UI Extension drinking-water educational program resulted in Idaho's public becoming more educated about drinking water and more proactive to insure that drinking water supplies were safe. Several Extension surveys about drinking-water quality in the Pacific Northwest states (Oregon, Washington, Alaska) and Idaho have been published in the last twelve years (Mahler et al. 2010; Mahler et al. 2015; Mahler and Barber 2016; Mahler 2021).

Surface Water Quality

Based on survey data, the percentage of Idahoans that considered surface water quality either good or excellent between 1988 and 2023 is shown in Figure 2. In the 1980s and 1990s, between 38% and 40% of Idahoans considered surface water quality good or excellent; however, after 2000 the percentage of survey respondents who thought that surface water quality was good or excellent increased from 43% (2002) to about 60% (2023). Consequently, public opinion about surface water quality greatly improved over the thirty-five-year survey study (Table 1). Many of the water resource Extension educational sessions included field trips that allowed residents to visually see surface water bodies and actually collect water samples to determine several water-quality parameters. Thus, many Idaho citizens became more aware of surface water quality when they were on their own time driving, biking, or hiking by surface bodies of water. The percentage of Idahoans that had no opinion about surface water quality declined from 20% in 2002 to 10% in 2023. Additional details about citizen views on surface water quality have been published recently (Mahler et al. 2014; Mahler and Barber 2017; Mahler et al. 2019: Mahler et al. 2020; Mahler 2019).

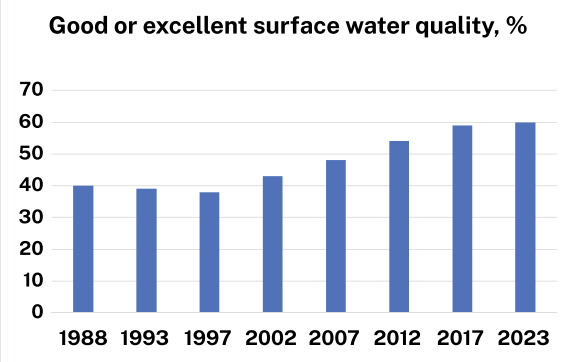


Figure 2. Percentage of Idahoans that consider surface water quality to be good or excellent based on University of Idaho surveys conducted in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023.

Groundwater Quality

Idaho surveys conducted between 1988 and 2023 showed that between 20% and 38% of the public considered groundwater quality to be good or excellent (Figure 3). The general trend was that a large share of Idahoans considered groundwater quality to be improving over time. However, a significant share of the surveyed public were unsure about groundwater quality, because "don't know" answers ranged from 21% to 31% during the thirty-five-year survey study. This is probably due to fact that groundwater is essentially invisible to the average Idahoan. Consequently, the public had a higher view of the quality of water that they could actually see (surface water) than water that is invisible to the naked eye. Based on data collected by state and federal agencies, the quality of both surface and groundwater is generally good or better. Additional surface and groundwater quality survey information about Idaho, Washington, Oregon, and Alaska has been recently published (Mahler et al. 2014; Mahler and Barber 2017; Mahler 2019; Mahler et al. 2019; Mahler et al. 2020).

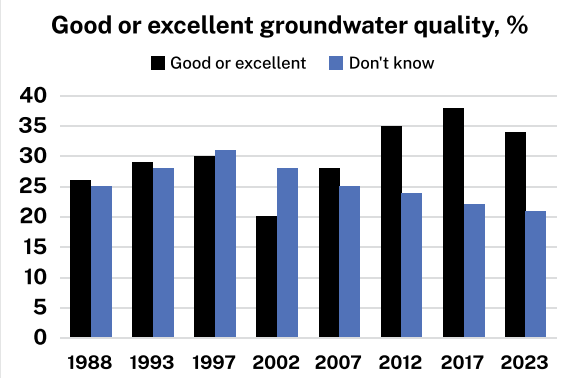


Figure 3. Percentage of Idahoans that consider groundwater quality to be good or excellent based on University of Idaho surveys conducted in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023.

Voluntary Actions to Protect Water Quality

Due to Extension education in Idaho, a significant portion of Idaho residents took voluntary actions to protect water quality. Prior to this survey study, community input from people interested in water quality indicated that people were more likely to take voluntary actions to protect water quality than have state and/or local governments regulate improved water quality. Voluntary actions to protect water quality fell into the following five categories: (1) better home waste disposal, (2) responsible pesticide/fertilizer use in homes, gardens, and farms, (3) correct disposal of used motor oil from vehicles, (4) making sure that soils were covered to present erosion into surface water bodies, and (5) using water responsibly to prevent leaching of nutrients and pesticides into groundwater.

Examples of voluntary actions to make home waste disposal less damaging to the water and environment included (1) saving products considered hazardous wastes for local collection days instead of disposing in the regular trash, (2) safely disposing of unused pharmaceutical products, (3) composting food wastes when possible, (4) more frequent servicing of septic tanks and systems, (5) increased recycling, (6) preferentially buying items with minimal packaging, and (7) eliminating sink disposal of items that contain metals.

Examples of voluntary actions to reduce pesticide/fertilizer impacts on water quality included (1) reduced use of fertilizers in yards, (2) reduced use of fertilizers on house plants, (3) reduced use of pesticides in the yard and/or home, (4) use of slow-release fertilizers in yards or on house plants, (5) more effective timing of fertilizer applications to match nutrient availability with plant growth, (6) adhering to pesticide labels about application rates on lawns and gardens, (7) making sure that the appropriate pesticide is used to kill the targeted pest and do the least potential damage to the environment, (8) using natural pesticides such as soaps that are less harmful to water quality, and (9) when weeds are the problem considering hand pulling them or conducting shallow soil cultivation as an alternative to using chemicals. All of these practices are deemed BMPs and have been taught and emphasized by Extension educators to the public (Mahler and Barber 2013).

Between 1988 and 2023, voluntary actions to protect water quality in Idaho increased dramatically, reflecting the success of long-term Extension education and outreach campaigns. In 1988 only 26% of Idahoans reported taking one or more voluntary actions to protect water quality, while by 2023 over 80% of surveyed residents reported that they took at least one voluntary action that was designed to protect water quality (Figure 4). These simple numbers show that people want to protect water quality and that they are willing to do their part.

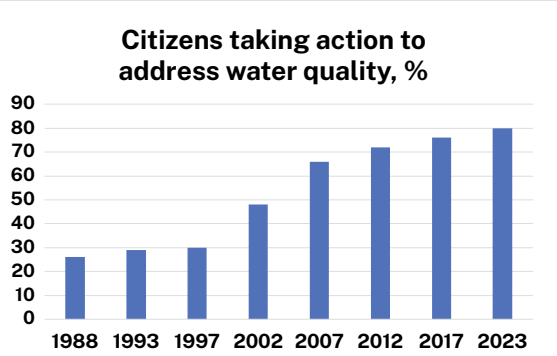


Figure 4. Percentage of Idahoans that have taken at least one voluntary action to improve water quality based on University of Idaho surveys conducted in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023.

When survey-year comparisons between 1988 and 2023, 1988 and 2012, and 2012 and 2023 were made, significant upward trends were observed for public responses (Table 1). Even though Idahoans are willing to take voluntary actions to protect water quality, a majority of Idahoans oppose regulations that require water quality protection. The most common voluntary actions that Idaho residents have taken to protect water quality since 1988 include (1) properly disposing of hazardous waste from households and yards (69%), (2) properly disposing of used motor oil (64%), (3) improving fertilizer and pesticide usage (45%), and (4) adapting watering practices to reduce runoff into surface waters and reduce leaching into groundwater (43%).

Voluntary Actions to Protect Water Quantity

Water-quantity programming by Extension educators taught and empowered Idahoans to take voluntary actions to address water-quantity issues in Idaho. Categories of voluntary actions to conserve water quantity include (1) changing yard (outdoor) watering, (2) changing household water use, (3) changing vehicle washing, and (4) installing a water-saving appliance. Examples of installing a water-saving device include (1) installing low-flow shower heads, (2) installing low flush toilets, (3) installing water-efficient dishwashers, (4) installing efficient clothes-washing machines, (5) fixing faucet leaks, and (6) installing ice makers in freezers.

Yard-watering strategies that could lead to increased water conservation cited by survey respondents included (1) watering lawns less frequently, (2) watering large outdoor plants with drip irrigation, (3) more frequent use of native plants in the landscape, (4) using grass varieties that are more tolerant of dry conditions, (5) installing lawn and shrub sprinklers, (6) using xeriscaping more often, (7) installing timers on sprinkler systems, (8) removing portions of the lawn, and (9) replacing lawns with artificial turf.

Strategies for reducing water use inside a home listed by survey respondents included (1) taking shorter showers (installing low-flow shower heads), (3) using low-flush toilets, (4) only washing full loads of dishes in dishwashers, (5) only washing full loads of laundry, and (6) reducing water flowing out of faucets when doing simple things like brushing teeth, shaving, or washing vegetables.

Between 1988 and 2023, voluntary actions to protect water quantity (water conservation) in Idaho greatly increased, reflecting the success of short- and medium-term Extension education and outreach campaigns. In 1988, only 16% of Idahoans reported taking voluntary actions to protect water quantity, while by 2023 over 73% of surveyed residents reported that they took at least one voluntary action that was designed to conserve water quantity (Figure 5). These numerical trends show that the Idaho public wants to protect water resources and that people as individuals are willing to do their part. Conversely, survey results show that over 64% of Idahoans oppose regulations that mandate water-quantity protection (conservation). When survey-year comparisons between 1988 and 2023, 1988 and 2012, and 2012 and 2023 were made, significant positive differences over time were observed for public responses (Table 1).

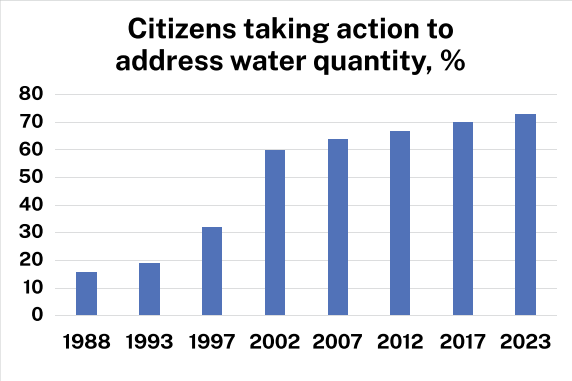


Figure 5. Percentage of Idahoans that have taken at least one voluntary action to improve water quantity (conservation), based on University of Idaho surveys conducted in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023.

If the data is considered through a different lens, back in 1988 over 84% of Idahoans took no action to conserve water; however, by 2023 only 27% of Idahoans took no action to conserve water. This change over thirty-five years is remarkable; it is encouraging that people are now much more likely to proactively conserve water resources. Figure 5 shows the percentage of people that took at least one action to protect water quantity; however, in many instances a surveyed person took more than a single action. In fact, in the 2007, 2012, 2017, and 2023 surveys, an average survey respondent took two, two, three, and four voluntary actions to conserve water resources, respectively.

Population Growth

Idaho is a fast-growing state. In fact, Idaho's population has doubled during the thirty-five-year survey study. At the beginning of the survey study in 1988, Idaho's population was 985,000; however, by 2023 the state had grown to 1,965,000 people, a 99.5% increase in population. The 1993 survey results provided an indication that Idahoans were starting to worry about the potential negative impact of fast population growth on water resources. In fact, over time the percentage of Idahoans worried about the impact of population growth on water resources increased from 24% to 86% between 1988 and 2023 (Figure 6). There was a rapid uptick in public

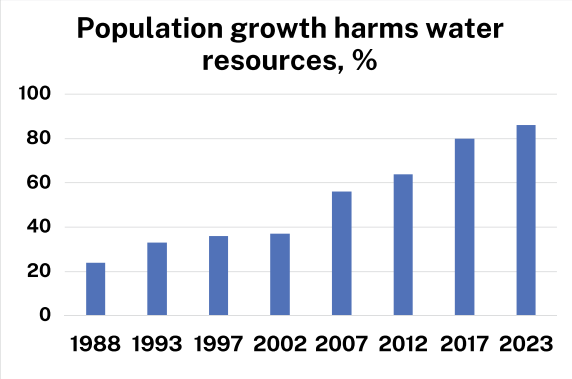


Figure 6. Percentage of Idahoans that feel that fast population growth has a negative impact on Idaho's water resources, based on University of Idaho surveys conducted in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023.

concern in the 2007 survey. The three-year comparisons in Table 1 highlight the statistical trends shown in this study. This change in public opinion over the thirty-five-year period of the water resources Extension program shows that people in Idaho have become much more concerned about water resources and how population growth may have a negative impact on them. The Extension water resources program was, at least in part, responsible for the public becoming more engaged in water issues.

Irrigated Agriculture

Prior to 1988, Idaho was considered a rural agricultural state. A plentiful supply of irrigation water allowed the Idaho desert to bloom and helped to make agriculture Idaho's major industry. Indeed, only three other states had more farmland under irrigation. In fact, the potato, Idaho's most valuable irrigated crop, appears on Idaho's license plate with the moniker "Famous Potatoes." Fast population growth in the last three decades has made Idaho more urban; however, agriculture and associated food processing still makes Idaho one of the five states most dependent on agriculture.

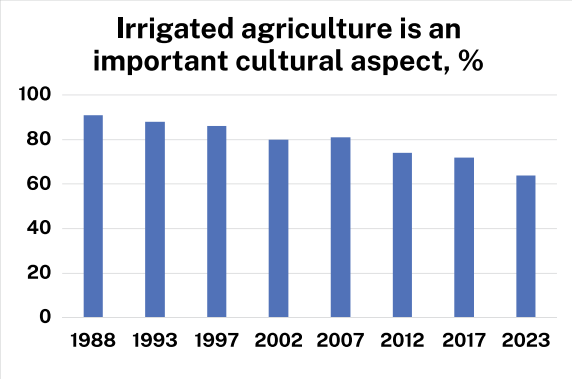


Figure 7. Percentage of Idahoans that feel that irrigated agriculture is an important cultural aspect of life in Idaho, based on University of Idaho surveys conducted in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023.

Since statehood, most Idahoans have considered irrigated agriculture an important cultural aspect of life in Idaho. The UI Extension water resources survey study shows that over 63% of Idahoans still considered irrigated agriculture to be an important aspect of life in Idaho in 2023 (Figure 7). The percentage has fallen from 93% in 1988. Population growth, particularly from immigration into the state from California, Washington, and Utah was particularly responsible for the reduced cultural connection in Idaho, since new residents from these three states are primarily urban. The downward trend will continue for at least the next decade with annual population growth projected to hover around 2%. The 1988/2023, 1988/2012 and 2012/2023 year comparisons show that the downward trend observed in Figure 7 is statistically significant (Table 1).

However, Idaho's major highway, Interstate 84, passes through a great expanse of irrigated farmland in the southwestern, southcentral, and southeastern parts of Idaho. People traveling on this major highway can not help but connect farmland, irrigation, and agriculture. The survey study confirms that a majority of Idahoans connect irrigated agriculture with Idaho. On a positive note, at least three in five Idahoans recognize this cultural legacy.

Role of State Government

Public perceptions of the role of state government in water resource issues between 1988 and 2023 are shown in Figure 8. Surveyed Idahoans could choose one of the following: (1) that state government had too much of a role in water resources, (2) that state government did not have enough of a role in water resource issues, or (3) that its current role in water resource issues is "just right." In 1988, 40% of Idahoans felt that state government placed the right amount emphasis on water resources and associated issues. Over time, however, an increasingly smaller percentage of survey respondents were satisfied with the level of interest the state took in water resources management. The most

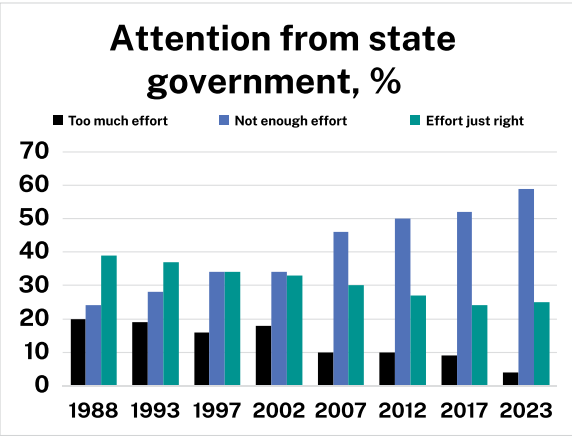


Figure 8. Percentage of Idahoans that feel that state government has too much, too little, or just the right role in the management of water resources, based on University of Idaho surveys conducted in 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023.

important set of bars on the Figure 8 graph is the percentage of Idaho residents that feel that state government is not spending enough effort on water resources. Basically, 24%, 28%, 34%, 34%, 46%, 50%, 52%, and 59% of the surveyed public in a given year felt that state government failed to address important water resource issues based on the 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023 surveys, respectively. This is a substantial change in public opinion over the thirty-five-year survey study. Reasons for the public becoming less satisfied with state government efforts to adequately address water resource public policy could be three-fold. First, the Idaho public has become more aware of the importance of water resource issues over the last two decades. Second, the public realized that water is a finite resource and that state government has a role in decisions for the wise use of it. Third, fast population growth has intensified the complexities in water allocations between user groups and the actual value of water in Idaho's major industries. The significance of yearly comparisons in Table 1 reinforces the significance of the graphic trends.

Back in 1988, only 20% of people in Idaho felt that state government had placed too much emphasis on the state's water resources; however, over time the percent of public concerned about too much state government management of water resources declined to only 4% by 2023. Extension water resource education programs play a substantial role in the public shaping a government role in water resources. Basically, educational programs increased the knowledge base of the importance of water resources which, in turn, caused people to want state government to play a more active role in maintaining water quantity, protecting water quality, and preserving safe drinking water.

Conclusion

Survey results document the positive impact Extension programming has had on public knowledge and attitudes toward water issues in Idaho over the past thirty-five years, including how voluntary actions over time positively impact water quality, quantity, and conservation in Idaho. Specific important findings of the thirty-five-year survey study include the following:

- Over 90% of surveyed Idaho residents considered their drinking water safe in 1988, 1993, 1997, 2002, and 2007. A strong majority of residents (>82%) still considered their drinking water safe in 2012, 2017, and 2023; however, the marketing campaign of in-home water treatment devices has made the public more skeptical about the quality of their drinking water.
- In the 1980s and 1990s between 38% and 40% of Idahoans regarded surface water quality as good or excellent; however, after 2000 the percentage of survey respondents who thought that surface water quality was good or excellent increased from 43% (2002) to about 60% in 2023. Consequently, public opinion about surface water quality greatly improved over the thirty-five-year survey study.
- Survey data collected between 1988 and 2023 showed that between 20% and 38% of the public considered groundwater quality to be good or excellent. The general trend during this period is that a large portion of Idahoans considered groundwater quality to be improving over time.
- Between 1988 and 2023 voluntary actions to protect water quality in Idaho increased dramatically, reflecting the success of long-term Extension education and outreach campaigns. In 1988, only 26% of Idahoans reported taking voluntary actions to protect water quality; by 2023, however, over 80% of residents reported taking at least one voluntary action designed to protect water quality.

- Between 1988 and 2023 voluntary actions to protect water quantity (water conservation) in Idaho greatly increased. In 1988, only 16% of Idahoans reported taking voluntary actions to protect water quantity; by 2023, over 73% of surveyed residents reported taking at least one voluntary action designed to conserve (protect) water quantity.
- Over time, the percentage of Idahoans worried about the impact of population growth on water resources increased from 24% to 86% between 1988 and 2023. The change in public opinion over the thirty-five-year period of the water resources Extension survey program shows that people in Idaho have become much more concerned about water resources.
- The water resources survey study showed that over 63% of Idahoans still considered irrigated agriculture to be an important cultural aspect of life in Idaho in 2023. However, this percentage has significantly fallen from 93% recorded in 1988. This change can be attributed primarily because of rapid urbanization from an in-migration of new residents from California, Utah, and Washington.
- Approximately 24%, 28%, 34%, 34%, 46%, 50%, 52%, and 59% of the surveyed public felt that state government failed to address important water resource issues, based on the 1988, 1993, 1997, 2002, 2007, 2012, 2017, and 2023 survey results, respectively.

The collected survey data indicate that public knowledge about water issues in Idaho significantly improved over the thirty-five-year data collection period. In addition, the majority of Idaho residents surveyed took voluntary positive actions to protect/improve water quality and water conservation within the state.

In addition to UI Extension's efforts, several other federal and state agencies, including nongovernmental organizations, carried out significant water outreach programs during the thirty-five-year study period outlined in this publication. Some of the agencies conducting successful water outreach included the following: the USDA-NRCS, Idaho Department of Environmental Quality, Idaho Soil Conservation Commission, Idaho State Department of Agriculture, Idaho Association of Soil and Water Conservation Districts, and Idaho Water Resources Research Institute. Most of these outreach programs were well designed and contained relevant water information for Idahoans. All of them met regularly and shared outreach efforts with each other. However, the success of these outreach programs were never scientifically measured and their efforts were smaller in scope and coverage than that of Extension in Idaho. All agencies deserve credit for improving the Idaho public's awareness of water resource issues.

The University of Idaho had the largest, best-known outreach effort in Idaho and it reached all counties and five Native American reservations in the state. When workshops, newsletters, local newspapers, press releases, and active youth programs are considered, public contacts exceeded 118,000 Idahoans on an annual basis or almost 10% of adults and school children in Idaho! By all accounts, Extension has had a significant and major impact on the education of Idahoans about water resources in Idaho.

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